

### **REMARKS**

Claims 1-23 have been cancelled without prejudice and claims 24-51 have been added in place thereof. Claims 24-51 are an exact duplicate of the originally submitted claims in the present application, and thus it is believed that no additional fee is due. The undersigned wishes to express his personal appreciation to Supervisory Patent Examiner Brett Krause for assistance in determining the appropriate course of action in this application.

### **AMENDMENTS TO ABSTRACT**

Minor amendments have been made to the Abstract to remove the word "comprise". Reconsideration of the objection to the Abstract is thus respectfully requested.

### **SAME INVENTION TYPE DOUBLE PATENTING REJECTION**

The undersigned requests reconsideration of this rejection based on the new claims that have been submitted. The new claims are believed to be patentably distinct from the claims of application serial number 10/287,561, which has now issued as US 6,989,197.

### **REJECTION UNDER 35 U.S.C. § 102**

Claims 19-23 were rejected as being anticipated by Hohman (US 5,871,604). It is submitted that the new claims 24-51 are not anticipated by Hohman. This rejection is respectfully traversed.

**REJECTION UNDER 35 U.S.C. § 102(B)**

Claims 19-23 stand rejected under 35 U.S.C. § 102(b) as being unpatentable over Hohman (U.S. Pat. No. 5,871,604). Claims 19-23 have been cancelled, but the undersigned wishes to provide the following comments relative to Hohman.

The Examiner will note that Hohman is directed to a method for forming a composite material having improved interlaminar ply strength and resistance to shear forces. It is mentioned that fibers are included in the resin matrix material, but there is no mention that these fibers are Shape Memory Alloy (SMA) fibers, or that they have the superelastic qualities of SMA fibers. Also, there is no mention that increasing the compression after impact (CAI) strength of the composite material is an objective of the composite material in Hohman. From a careful review of the Hohman patent, the undersigned submits that increasing the CAI strength of the composite material was not a consideration in Hohman.

The Examiner will also appreciate that, while simply including fibers in the resin matrix material may improve the interlaminar ply strength of the overall composite material, such is not likely to have any appreciable effect on improving the compression after impact strength of the material. In the present application, the SMA particles, with their superelastic quality, provide significantly enhanced CAI strength. This is highly advantageous in many applications, particularly in aerospace applications such as with the manufacture of composite aircraft components such as fuselages and wings, which may occasionally suffer impacts from objects (e.g., birds). The SMA fibers used in the

resin of the claimed subject matter enable composite articles to be formed that have significantly improved CAI strength, yet the presence of the SMA particles does not significantly complicate the manufacture of a composite article. Each of the pending independent claims from new claims 24-51 recite that the particles added in the resin are SMA particles.

In view of these important distinctions, it is believed that this rejection would be improper if applied to the newly added claims 24-51. Accordingly, it is respectfully submitted that all of claims 24-51 are patentable over Hohman.

#### **REJECTION UNDER 35 U.S.C. § 103**

Claims 13-16 submitted in the previous preliminary amendment were rejected as being obvious over Hohman in view of Hagood IV et al. (US 6,048,622). As noted above, claims 13-16 have been cancelled. Nevertheless, the undersigned wishes to comment that he believes the new claims 24-51 to all be patentable over the Hohman/Hagood IV et al. combination. Hagood IV et al. appears directed to a composite material making use of piezoelectric materials to sense deformation and twisting of the composite material. In column 12, lines 13-29 noted by the Examiner, it is mentioned that an alternative implementation may use shape memory alloy fibers arranged in parallel arrays, and embedded in a soft polymer matrix. The SMA fibers are sensitive to temperature changes that cause them to deform. This is completely different from the manner in which SMA particles are employed in the resin of the various embodiments of the present application to increase CAI strength. In the present application, the thermal sensitivity of the SMA particles is not being relied on, and by

itself would provide no benefit toward increasing the CAI strength of the overall material. The feature of increasing CAI strength is not discussed in Hagood IV et al., presumably because this would provide no benefit to the composite material relative to enabling one to sense the deformation or twisting of the composite material. There is further no discussion or suggestion in Hagood IV et al. as to how the SMA fibers would need to be arranged, or in what quantity, in order to provide some appreciate CAI increase to the overall composite article.

From a practical standpoint, the Examiner should also appreciate that using elongated SMA fibers would likely make flowing of the resin difficult or impossible during wetting of a fabric. Hagood IV et al. does not contemplate doing this, nor does Hagood IV et al. suggest this. Specifically, column 12, lines 13-29 says that the SMA fibers are “arranged in parallel arrays”, and embedded in soft polymer materials” (emphasis added).

Since there is no suggestion in Hohman as to the desirability or motivation to use SMA particles to improve CAI strength of a composite material, and since Hagood IV et al does not disclose or suggest using SMA particles in a resin in a manner that can improve SMA strength, it is submitted that a rejection based on Hohman/Hagood IV et al. would be improper.

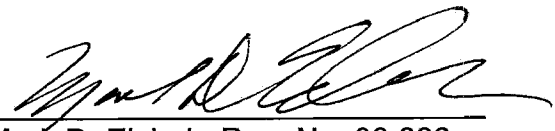
## **CONCLUSION**

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is

believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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